Onsite Engineering, Inc.

*Water, Wastewater and Stormwater Specialists*

April 4, 2016

Mr. Fran Zarette, P.E.
Smart Growth Design, LLC
625 South Street
Shrewsbury, MA 01545

Re: Response to Peer Review for Water
The Pointe at Hills Farm, Shrewsbury, MA

Dear Mr. Zarette:

We have received and reviewed a copy of the letter entitled "Pointe at Hills Farm Peer Review for the Water Service" dated March 15, 2016 by Tata & Howard. Based upon our review it appears that the peer reviewer generally agrees with the results presented in our Preliminary Water Study dated March 1, 2016. A summary of the main components of the peer review letter and our responses are provided below:

- Determination of Flow – Tata & Howard concurs that an estimated water usage of 141 gpd per unit is a reasonable estimate for water use for the proposed development. Based on the current total number of units (248), the estimated total daily usage is 35,000 gpd for both phases.

- Site Plans – Tata & Howard offered a number of comments and recommendations regarding the proposed water main layout, valve and hydrant locations, pipe materials and notes that should be added to the plans. These suggestions will be incorporated into the final plan set prior to construction, as summarized below:
    - Class 53 ductile iron pipe will be used.
    - Water services shall be plastic pipe rated at 200 psi.
    - The size of the main in the development will be 8-inch.
    - The Stoney Hill Road connection for Phase 1 will include triple gates if connected to the existing Low Service Area water main. Existing water main materials and pipe diameters on Stoney Hill Road and Hartford Turnpike will be identified on the plans.
    - The condition of the existing valve on Stoney Hill Road will be verified with the Water Department. Existing water main materials and pipe diameters on Stoney Hill Road and Hartford Turnpike will be identified on the plans.
    - The location of the valve separating the Low Service Area and Reduced High Service Area will be verified with the Water Department and identified on the plans.
    - An additional hydrant can be located near Station 7+00 of Phase 1, if desired. It should be noted that the hydrant locations as provided on the plan were jointly selected by Waterman Design Associates and the Shrewsbury Fire Chief.
    - The water service to each building will be clarified to identify the size and configuration of both the domestic and fire service lines. Individual shut-offs for each line will be provided. The size of the fire service line will be determined in consultation with the fire protection engineer.

- Hydrant Flow Tests – It is our understanding that Tata & Howard adjusted several parameters in the hydraulic model to reflect the field results obtained during the hydrant flow tests. The adjustments required are not unusual given the size and complexity of the Shrewsbury Water System.

- Hydraulic Evaluation – Tata & Howard utilized the Town's existing hydraulic model to verify the static and fire flow pressure estimates presented in our report. As summarized in the table below, the model generally indicated similar static pressures to those estimated, while the fire flow estimates were slightly lower than those estimated. The peer review recognizes the use of the ISO Guide for determining the estimated needed fire flow of 1,000 gpm at 20 psi, but requests that the actual fire flow requirement be identified by the fire protection engineer during the design of the fire protection system.

| Phase | Condition (Service Area) | Requirement | Onsite Estimated Result | T&H Estimated Result | Requirement Met? |
|---|---|---|---|---|---|
| 1 | Static (LSA) | 35 psi minimum | 46 psi | 45 psi | YES |
| | Fire Flow (LSA) | 1,000 gpm at 20 psi | 810 gpm at 20 psi | 750 gpm at 20 psi | NO |
| | Fire Flow (RHSA) | 1,000 gpm at 20 psi | 1,500 gpm at 20 psi | 1,200 gpm at 20 psi | YES |
| 2 | Static (RHSA) | 35 psi minimum | 66 psi | 65 psi | YES |
| | Fire Flow (RHSA) | 1,000 gpm at 20 psi | 1,400 gpm at 20 psi | 1,200 gpm at 20 psi | YES |

  - Phase 1 – In their letter report Tata & Howard concurred that connecting Phase 1 to the RHSA would mitigate the fire flow requirement, but identified that the connection could have a negative impact on the static pressures along Stoney Hill Road, Deer Run Drive, Thistle Hill Drive and Quail Hollow Drive. In order to avoid this potential negative impact, we recommend that a parallel 300 linear foot water line be constructed on Stoney Hill Road between the entrance to the Phase 1 portion of the project and Hartford Turnpike Road. The parallel main would allow the development to be connected to the RHSA, whereas the existing homes on Stoney Hill Road would remain on the LSA. During the public hearing for the project, Tata & Howard appeared to agree with this solution.
  - Phase 2 – Tata & Howard did not specify any hydraulic concerns or requirements regarding the Phase 2 portion of the project.

- Vinyl-lined Asbestos Cement Water Main – It is our understanding that the water main located on Hartford Turnpike in the Reduced High Service Area that would serve the project is vinyl lined asbestos cement (AC). Tata & Howard raised potential water quality concerns with this main due to the possibility of perchloroethylene (PCE) leaching into the water and recommended the replacement of 2,900 linear feet of existing vinyl lined AC main in this area. However, it is our understanding that the existing houses on Stoney Hill Road are all currently served by this main. We also understand that the Town specifically monitors this section of water main for PCE, of which, no results above the regulatory limit have been recorded. Furthermore, since the proposed project would actually loop this water main and increase the demand through it, it is our opinion that the proposed connection would be a benefit in and of itself, due to the increased flow through the pipe, the reduction in water age in the pipe and likely improved overall water quality for the users in this part of the system. In addition, the loop created by the proposed parallel line connecting to Phase 1 would reduce the need to flush this segment, thereby saving the Town

operational resources. Lastly, it is important to note that the Town has adopted a Capital Efficiency Plan for the entire water system, which was prepared in 2014 by Tata & Howard and indentifies the various short and long term improvements required to maintain the water system. Based upon our review of that report, it does not appear that this section of water main was identified as a target for replacement in any of the short or long term capital planning. Therefore, based upon the fact that no water quality issues have ever been recorded from this water main, that the water flow through the pipe will improve due to increased flow and the newly constructed loop, and that this section of main has never been identified as a target for replacement, we believe that there is no tangible benefit or requirement that this work be performed as part of the proposed project.

- Water Management Act (WMA) Permit – Tata & Howard identified that the Town of Shrewsbury has a WMA permit with an approved daily average withdrawal volume of 4.17 mgd. Mitigation measures are required once water withdrawals exceed a baseline of 3.91 mgd. It is our understanding that the estimated water withdrawal of 42,300 gpd (or 0.042 mgd) by this project would increase the Town's average daily demand to approximately 3.74 mgd - still within the Town's WMA permit and below the baseline volume. Tata & Howard goes on to indicate that the Town may be able to utilize the stormwater management practices identified in the design for this project as mitigation credit, if necessary. The estimated maximum day demand (MDD) for the development of 67,700 gpd (or 0.068 mgd) would increase the Town's MDD to approximately 5.76 mgd – again, well below the Town's maximum daily withdrawal rate (of 7.8 mgd). Therefore, it is our interpretation that no Water Management Act permit issues are anticipated due to this project.

We appreciate the opportunity to work with you on this important project and look forward to meeting with the Town's reviewer to resolve any outstanding water issues. If you have any questions or require additional information, please feel free to contact me directly at 978-660-2752.

Sincerely,

Onsite Engineering, Inc.

Susan Hunnewell, P.E.
Vice President - Director of Water Engineering

Cc: Wayne Belec, Waterman Design Associates
Town of Shrewsbury